NEWSLETTER OF THE ENGLISH HERITAGE RESEARCH DEPARTMENT

# RESEARCH NEWS


*The fortress that is Dover Castle, Kent, as seen from the air - see pages 3 to 19*

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The main theme of this issue of *Research News* is research work contributing to the reinterpretation and presentation of the Great Tower of Dover Castle. Led by English Heritage's Properties Presentation Department, this ambitious project will display the tower in the context of its original function during the reign of Henry II. The multidisciplinary teams within Research Department have provided the project with new information in support of the redisplay, and the fruits of this research work on the site are summarised in a series of articles introduced by Paul Pattison's overview. The study of the Great Tower itself in a major survey is described, and findings from its later periods of use are presented. New techniques of recording have allowed further appreciation of the historic graffiti within the Tower. The tower stands within the Inner Bailey, surrounded by buildings whose superficial similarity belies their complex chronology. A survey of the buildings in the Bailey, combined with targeted excavation around the base of the Tower itself, and within the 13th-century structure of Arthur's Hall has produced valuable new insights into the early structural history of the Great Tower and Inner Bailey, which will be invaluable background information for the new redisplay.

Only a short distance along the coast from Dover is the site of Richborough. This has long been known as the location of the first landfall of Roman forces during the Claudian invasion of AD 43, and later developed into a major port town. In the early fourth century a fort of the Saxon Shore series was erected. There has long been controversy over the location of the Roman shoreline, and new excavations have addressed this problem, revealing not only the Roman beach, but also extensive medieval use of the site, including a small dock.

Research Department teams continue to adopt and test new methodologies across the whole breadth of the Department's activities, and two very contrasting examples are reported here. The Imaging, Graphics and Survey Team show the utility of newly available base mapping data for landscape and other surveys, which is being used to great advantage by our Survey teams. The Archaeological Conservation Team have experimented with ways of drying archaeologically recovered waterlogged leather.

Among the smaller contributions new survey of earthworks at Damerham, Hants will drive new research into an intriguing landscape. At Fort Cumberland a new, refurbished, finds processing facility will greatly improve working conditions in this area.

***Christopher Scull***
*Research Director*
*Research and Standards Group*

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# Dover Castle: the Great Tower project

**A dramatic new visitor attraction in the Great Tower at Dover Castle has provided the opportunity to take a new, closer look at the architecture, archaeology and history of this great building and its immediate suroundings.**

Early in 2008, a team from the Properties Presentation Department began a major project at Dover Castle, to re-present the Great Tower keep to show its original function as an occasional fortress-residence for the itinerant royal household of Henry II. As Dr Anna Keay, Director of the department remarked in *Conservation Bulletin 58* (summer 2008), the aim is to re-present the castle as 'the most lavish creation of King Henry II' and 'to evoke its appearance at the end of the 12th century'. The castle was almost entirely rebuilt from 1179, substantially by Henry II but completed by John and Henry III in the early 13th century. The Great Tower is the last and one of the most elaborate in the Anglo-Norman style.

On completion in August 2009, the Great Tower will re-open to the public as a fully dressed, walk-through experience to provide an impression of how it might have been used in the mid 1180s. It will be supported by an introductory exhibition housed in one of the bailey buildings, the mid-13th century Arthur's Hall.

At the outset, several leading historians were commissioned to assist in a re-interpretation of the origin, purpose, and function of the Great Tower, and also to explore details of the lives of the elite and their servants. This information was received in a series of detailed reports which formed the historical basis for the re-presentation. The Properties Presentation Department team went on to develop a series



Henry II's great work; the Great Tower and Inner Bailey form the core of Dover Castle




The new pesentation is designed to give a flavour of the magnificence of courtly interiors in the 12th-century, as shown by this embroidered backdrop made by the Royal School of Needlework

of linked room scenarios with the assistance of a professional theatre designer, and to commission 'reproduction' furniture and objects from many different craftspeople and suppliers.

Building works to enable the project have been kept to a minimum, but nonetheless presented an opportunity to re-examine issues associated with the building of the tower and its immediate topography and with its entire history. Consequently, the *Dover Castle Project* was jointly initiated and managed by the Properties Presentation Department (Paul Pattison)and Archaeological Projects (Brian Kerr), within the Research Department of English Heritage. The project was multi-disciplinary, drawing on the expertise of teams from Architectural Investigation; Archaeological Survey and Investigation; Imaging, Graphics and Survey; and Metric Survey, and appropriate consultants. These teams carried out a programme of survey, photography, documentary research and excavation based partly upon the needs of planning consents but partly also on the need to address some key questions identified in the Research Design. This document is concerned with the *whole* history and development of the Great Tower, not only the late 12th century. Some of the most significant of these questions were:

- *What was the nature of the use of the building from the late 15th century to the mid-18th? What could anything be identified in the fabric for this long period?*
- *From the late 17th century the Great Tower was used to incarcerate prisoners of war. The ubiquitous graffiti in the tower is potentially one of the best and most interesting untold stories of Dover Castle. The extensive prisoners' graffiti of the late 17th century onwards seems to be mainly POWs from Marlborough's campaigns of the early 18th century. Can recording and analysis, in conjunction with documentary research, reveal the full story of how the Great Tower was used as a military prison?*
- *The inner bailey of the castle was built at the same time as the Great Tower. We know little, however, about its buildings. Much of what is visible is the product of Georgian and later adaptation and rebuilding as a military barracks, though an undefined quantity of fabric is thought to be medieval. Could survey and excavations reveal anything of the medieval, even 12th-century construction phases? In particular, Arthur's Hall is to be the venue for a new exhibition, and there is a needed to unravel its detailed fabric history and determine whether any archaeology had survived a largely undocumented excavation of c. 1970.*
- *Excavations in the 1960s resulted in the idea that the Great Tower may have been contrived to appear as if on a hill or motte. This was achieved by carrying the ashlar of the turret and pilaster plinths to ground level while the rubble coursing between them was partially concealed by an earth mound. Could small keyhole excavations at the base of the tower confirm this interpretation and advance our knowledge of the hill prior to building?*

The close collaboration of the specialist research, architectural analysis and archaeological teams was a joy to witness,

Much research has gone into the design of the furniture for the Great Tower, as in the king's bed, here being finished with figurative panels

with ideas and theories tried and tested, and results from one team feeding into those of another - all attempting to answer these and other basic questions concerning room use, circulation and reasons for alterations. The purpose is to develop a clearer understanding of the archaeological and architectural evolution of the buildings, and of the castle as a whole. The initial results are explored in the following group of articles.

***Paul Pattison***



The less glamorous side of court life forms an essential part of the Great Tower's new displays, as here in the king's private kitchen

DOVER CASTLE

# The survey of the Great Tower

**Intensive archaeological survey of the Great Tower's fabric has provided a solid basis for subsequent analysis and interpretation.**

In 1998 a programme of conservation was begun to reduce water ingress through the external surfaces of the Great Tower. These surfaces constituted a patchwork of construction, repair and alteration documenting the 800-year history of the building. An archaeological recording project was carried out to inform the conservation work and provide an archive record. Subsequent analysis of the survey record has revealed much about the original design and appearance of the Great Tower. By unpicking phases of secondary intervention to the structure the survey is helping to present a picture of changing attitudes toward, and uses of, this magnificent building.

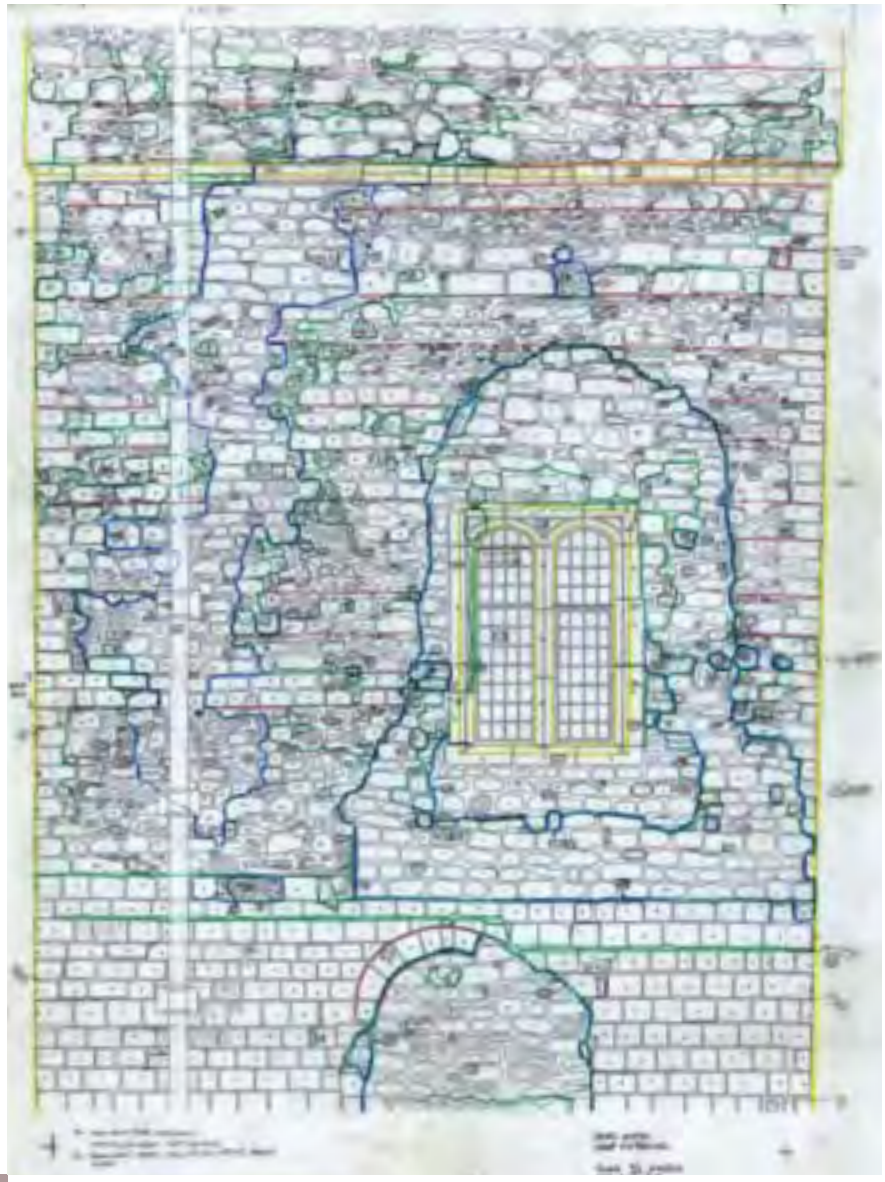




*Fig 1:* One of over 170 site survey drawings

The survey used a stone-by-stone photogrammetric record as a base and covered all external elevations, the interior of the Forebuilding and selected wall faces within the Great Tower itself. Figure 1 illustrates additional information added on site: the geology of each stone was recorded; discrete areas of mortar were defined (green) and a chronological typology of 25 distinct mortars established; primary and secondary structural information was highlighted (red and blue) and a context record of over 2500 individual features generated.

Previous studies of the Great Tower have largely married documentary references with an architectural analysis of the structure. This then slotted into and around the contemporary understanding of what a keep was for. Presumptions were made about the early form of the Dover keep, based perhaps more on what it was expected to have been like rather than what the evidence in the fabric suggested. The survey at Dover attempted to be as objective as possible in its recording and analysis. It generated a mass of micro-level observations which gradually coalesced to form a wider understanding of the whole, with 12 major phases of intervention being identified from the late 12th-century construction to restoration work in the 1930s (fig 2). The overall result has been at once to give a clearer yet also more complex impression of the building's design, appearance and function.

A remarkable amount of primary facing survives on the exterior of the tower, revealing a carefully choreographed design

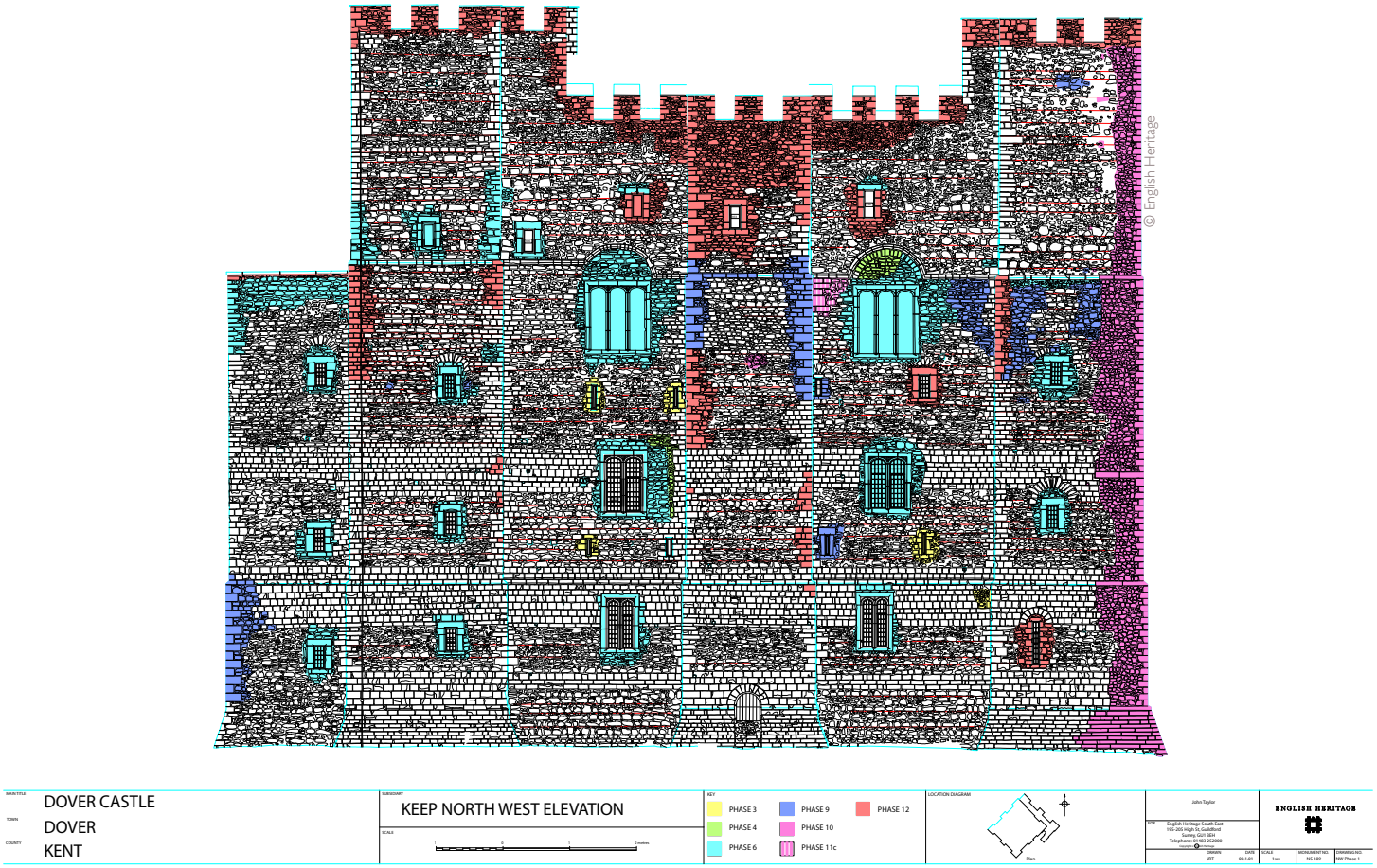




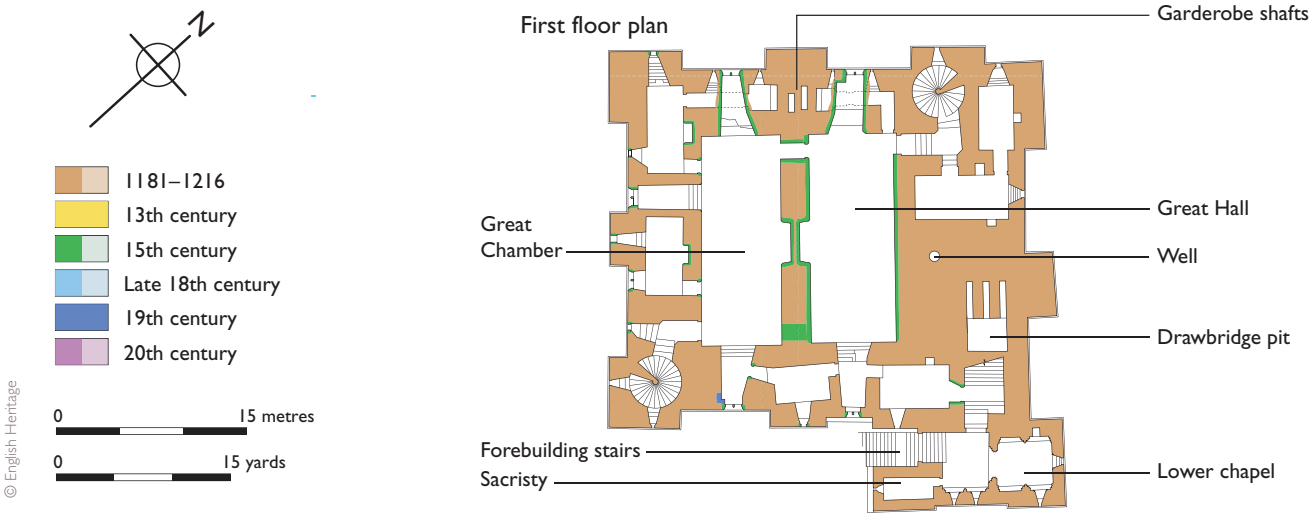

*Fig 2:* Digitised phase drawing for the NW elevation

which was aesthetically impressive but which also conveyed the hierarchy of the internal spaces. It is now thought that the exterior was dominated by five light bands of Caen ashlar or render, which contrasted with panels of rag-stone rubble face work. The survey has identified where certain areas of the exterior were deliberately embellished or played down and demonstrated the scale and position of the 12th-century fenestration.

Internally the survey has found evidence for the original roof form being countersunk within the upper gallery level creating single-storey principal chambers rather than the double-height rooms previously supposed. There is now a better understanding of the size and accessibility of window embrasures and confirmation that the 12th-century building lacked fireplaces. In addition the original locations of several internal doorways have been established, with others being shown to be later insertions, (fig 3). All these observations have thrown new light on the original functions of the Great Tower and offer a fresh insight into the way the spaces looked, felt and functioned.

The first revisions to the fabric appear to date to the 15th century, though in the

*Fig 3:* First floor plan showing 15th-century alterations to the original layout



Nigel Corrie, © English Heritage

*Fig 4:* The SW elevation of the Great Tower showing extensive 19th-century re-facing. Though there are clearly two styles at work here, they are likely to date to the same phase of restoration

early 13th century a cross-braced timber frame structure was inserted into the 1st floor north-east chamber to support the floor above. The 15th-century work falls into two distinct phases. Earlier in the century a campaign of repair was undertaken with some re-facing of wall surfaces and the adaptation of fenestration in order to make the interior less exposed to the weather. In about 1480, towards the end of Edward IV's reign (1461-1483), the building was extensively re-modelled, with the introduction of fireplaces, re-arrangement of doorways and enlargement of window embrasures. It is believed that the Forebuilding was first roofed at this time, though the survey suggests this was initially a timber-framed structure.

The initial survey found no evidence for alterations to the fabric during the 300 years after Edward IV, largely due to its focus on the external elevations. However recent work by Gordon Higgott on the documentary sources for the castle in the 17th and 18th-century sources has revealed internal alterations and changes in patterns of use which are in turn being identified in the fabric through further analysis. In the mid-18th century the Great Tower was converted for use as a barracks and almost all the principal windows were given new Portland stone frames (probably re-used from the now lost 17th-century works). Large areas of face-work and quoins were replaced in Portland stone and a new front wall to the Fore building stairs was erected, along with a new roof. Later in the century, vestiges of the medieval and post-medieval roof structures were lost with the insertion of brick vaults to the second floor. Midway through the 19th century two teams of military engineers appear to have competed to re-clad the SW elevation of the keep (fig 4).

The survey recorded a huge number of individual features and went a long way to defining the nature and extent of key phases of intervention. Recent documentary research and functional analysis commissioned for the representation project has drawn on the survey to inform and corroborate ideas, and through this work the survey is being challenged and finessed making it a yet more valuable tool as time goes on.

***Kevin Booth***

# The Great Tower in the seventeenth and eighteenth centuries



**In the early seventeenth century the Great Tower was prepared for a Royal welcome that never occurred...**

Although the masonry fabric of the Great Tower survives largely intact, almost all the medieval floor timbers have disappeared, along with the steep-pitched roofs over the two upper chambers and the wall panelling that was known to have existed in the many of the chambers at first- and second-floor levels. This roof structure was last recorded in a section through the Great Tower in 1729, before its replacement with parabolic brick vaults in 1799. Between these two dates, in 1747-56, the Forebuilding staircase was reconfigured, and a large Portland stone porch was removed. This porch, measuring 23 feet high and 14 feet wide, was the most conspicuous external feature of the last major refurbishment of the Great Tower for royal use, which occurred at the beginning of the reign of King Charles I in 1625-26, although no topographical record of the porch survives.

One of the aims of the study of the Great Tower and Inner Bailey by Architectural Investigation in 2008 was to uncover the evidence for the royal refurbishment in 1625-26, and to see what the records and physical traces of this work told us of the earlier patterns of use and decoration. This monumental building was identified by John




Board of Ordnance section through the Great Tower, 1729

Bereblock, in his bizarrely inaccurate but neatly annotated bird's-eye view of about 1570, as the '*Regale palatium*', or royal palace. The accounts for works carried out between 1 October 1625 and 30 September 1626 confirm that the two principal floors of the Great Tower functioned as the 'king's side' (upper level) and 'queen's side' (lower level) of the palatial donjon. The 'privy' or private side of both sets of lodgings was on the south-west, where four of the six bedchambers (two on each level) were located. However, the accounts also describe the repair or renewal of panelling in six bedchambers, so where were the other two? Channels and round fixing holes for the battens of panelling were noted in the walls of the four principal chambers, and similar round fixing holes were found in two smaller chambers on the south-east side of the Great Tower. Today, these chambers are entered from the north-east side as well as the south west, but on a survey plan of 1827 they are shown with doors on the south-west side

John Bereblock topographical view, c.1570

only, that is, on the 'privy' side of the former royal palace. Kevin Booth's fabric analysis indicates that from the 15th century onwards these small chambers were closed off on the north-east side and made part of a suite of panelled and heated bedchambers on the warmer southern side of the Great Tower.

What then was the purpose of the refurbishment in 1625-26 and what, if anything, can still be seen of the work? Scholars have assumed that all the work was completed for the reception of Charles I's bride Queen Henrietta Maria of France in the six months between their marriage by proxy in December 1624 and her delayed arrival in June of the following year. In fact, the accounts describe a longer programme of construction and decoration that began with repairs to the lodgings of the Duke of Buckingham as newly appointed Constable in December 1624 and continued until the autumn of 1626. Very little appears to have been finished in time for Henrietta Maria's stay of a single night on 15th June 1625. The point is underscored by the complaint of her chamberlain that she was lodged in 'an old building in the antique manner, where the queen was rather badly housed, poorly accommodated, and her train treated with very little magnificence, considering the occasion' (in memoirs of the Count Leveneur de Tillières).

Nevertheless, it is clear from the works accounts that a magnificent setting for court ceremony was created at Dover in 1625-26. It included the redecoration of existing panelling and coved or flat beamed ceilings

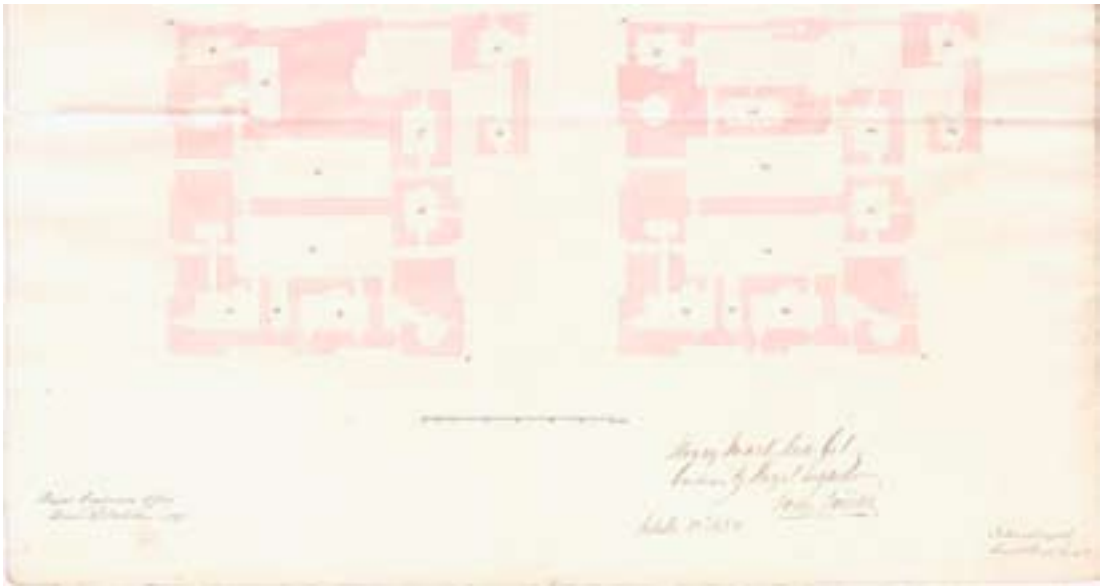


Photograph of panel fixings in second-floor secondary bedchamber

in the principal chambers and bedchambers, the addition of 'the great Rusticke dore… with Rusticke pillausters' at the foot of the stairs, and a refurbished lodging for the Lord Chamberlain, the master of court ceremonials, opposite the Forebuilding of the Great Tower. It is reasonable to assume that the refurbishments were intended by the Duke of Buckingham to provide a grand formal welcome for the new king and queen in the early years of their reign. The welcome never materialised, owing to fraught political circumstances during the war with France over the next two years and the Duke's assassination in August 1628.

***Gordon Higgott***





Plan of the Great Tower in 1827, first floor on left, second floor on right

DOVER CASTLE

# Arthur's Hall and the Inner Bailey

**The Inner Bailey of Dover Castle contains buildings ranging from the 13th to the 18th century; a fact belied by their superficial similarity.**

The buildings of the Inner Bailey today seem superficially similar in appearance and relatively few in number. However, these buildings are only part of the structures that existed during the Middle Ages and far from being homogenous, this series of apparently mid-18th century barrack blocks ranges in date from the 13th century to the 18th century.

Along the north-east side of the Inner Bailey is a suite of buildings created in the mid-13th century as the King's Lodgings. Arthur's Hall, a 14th-century name given to the hall built during Henry III's reign (1216-72), is the centrepiece of this range. The traditional story of its development, as revealed in documentary sources, is of a new hall built in the late 1230s and ready for use by 1240. This is the date of much of the fabric of the building, but in the south-east wall, above the arches of the service doors, are the remains of an arch from an earlier phase, possibly from King John's reign (1199-1216). The arch indicates a previous structure in this area, though the form of this earlier building is unclear. In the north-east corner, the floor of Arthur's Hall is interrupted, suggesting the site, or intended site, of a substantial stair up to the ramparts of the Inner Bailey.

Some of the architectural form of Henry III's hall can still be determined. It has retained its three service doors at its lower end. There is also some scarring in the side wall where the door into the cross passage from the Inner Bailey survives. At the upper end are the remains of a tall door from the front of the dais out into the Inner Bailey. This may have been the door into a pentice that ran north-westwards to the King's chamber.


Plan of Inner Bailey – Arthur's Hall marked E, Regimental Museum marked F, Shop marked J, Keep Yard 9 marked A, Keep Yard 7 marked C

Steve Cole, © English Heritage

Buildings of north-east side of Inner Bailey - Arthur's Hall in centre

The threshold of the door was not at the floor level, but 0.48m above the current level (approximately 0.6m above the floor in Henry III's time). This apparent anomaly is actually evidence for the existence of the upper end dais.

The service doors at the lower end of the hall demonstrate that the services and the kitchen lay to the south-east of the hall. The upper end of the hall, the site of the current regimental museum, may have been the site of the King's Chamber and perhaps of an earlier hall built for King John.

Documentary evidence for regular repairs reveals that Arthur's Hall and other buildings in this range remained in use, though not unaltered through much of the Middle Ages. John Bereblock's drawing of *c* 1570 suggests that it was provided with a new façade, and stratigraphic evidence for floor levels indicates that by the 16th century the floor level had been raised at least twice.

The other surviving medieval buildings around the Inner Bailey include Keep Yard 9 (the Palace of the Duke of Suffolk, as it was described in Bereblock's view). In 1625-6 the Duke of Buckingham converted this building into the Lord Chamberlain's lodgings for his use while staying at the castle. Bereblock also depicts the old armoury, and some of the fabric of the building on its site seems to be medieval in character (Keep Yard 8). He also shows Arthur's Lesser Hall, the current shop building, and some of this building's fabric appears to be medieval.

In the large campaign of work in 1625-26 the accommodation in the Great Tower was improved and a 'Rusticke dore' in Portland stone was built at the base of the stairs, near where Bereblock shows a medieval gabled

Central service door with remains of earlier arch above and to left

© English Heritage

doorway. This grandiose arch may have been similar in character to the contemporary York Water Gate at the Duke of Buckingham's London town house, still standing today. It survived until the mid-1740s, when it was dismantled. Some of its Portland stone was reused as the jambs of barrack windows and doors around the Inner Bailey.

Arthur's Hall remained a significant building until the 16th century but its current appearance is the result of a programme to create barracks in 1745-56. Like several buildings intended for use by ordinary soldiers (e.g. Keep Yard 7), its window and door jambs include pieces of stone that probably came from the 1620s 'Rusticke dore'. By contrast, the one medieval building that was adapted for use by officers in this period – Keep Yard 8 – has windows and doors constructed with new stonework.

Despite this variation in detailing, the overall effect of the mid-18th century phase was to create a superficially-unified series of blocks lining the Inner Bailey. Buildings once at the heart of the Royal accommodation were now central to the garrison guarding the front line of England's coast.

***Allan Brodie***

Steve Cole, © English Heritage NMR 17212/34 NY 7443/2 11-JAN-1999

Door of Arthur's Hall with reused trapezoidal stone

DOVER CASTLE

# Below the Ministry veneer: excavating where others left off

RESEARCH THEMES AND PROGRAMMES

E1 A2

**New excavations shed light on earlier work and confirm the wealth of the buried archaeological resource at the centre of the castle.**

As part of the research generated by the Dover re-display programme, the Archaeological Projects team was asked to address two key questions. First, could we say anything about the landscape of the Inner Bailey before and after the Great Tower was constructed *c* 1181-1188? And second, could we confirm or refute the survival of archaeological deposits within Arthur's Hall, a building that had been emptied of at least 1.5 metres of fill in the 1970s. The answers would inform not only the new display materials, but also the design of the necessary infrastructure.

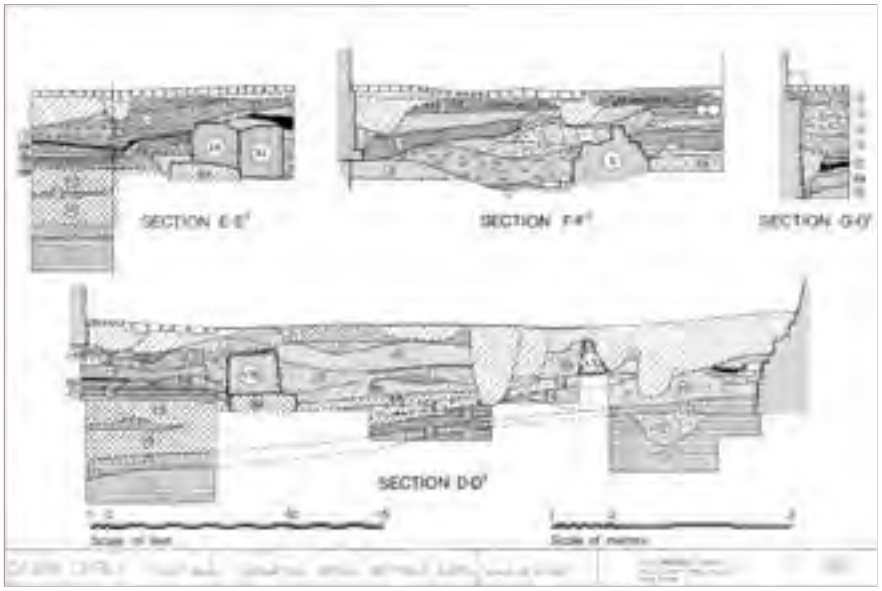
The site had been examined in the late 1960s and early 1970s after it was handed over from active military occupation. Stuart Rigold excavated around the east side of the Inner Ward when new services were added, publishing in the *Journal of the British Archaeological Association*. While his sections indicated deep stratigraphy on the east side of the Tower, no archive of detailed records could be found. The report suggested that the base of the Tower had been deliberately 'buried' with upcast soil to form the appearance of a motte, but this seemed odd given the limited viewing angles within the yard. Arthur's Hall was also excavated around this time, presumably to expose the three doorways at its south end. Here we are less fortunate, since no published record of the work could be found. Two drawings in the NMR showing some aspects of the work exist, however, and long-time EH staff members could remember an archaeological excavation of some sort taking place after the main clear-out of the Hall.

Having exhausted the potential of these earlier investigations, new excavations were needed. Two trenches were opened against the base of the Tower to see the early

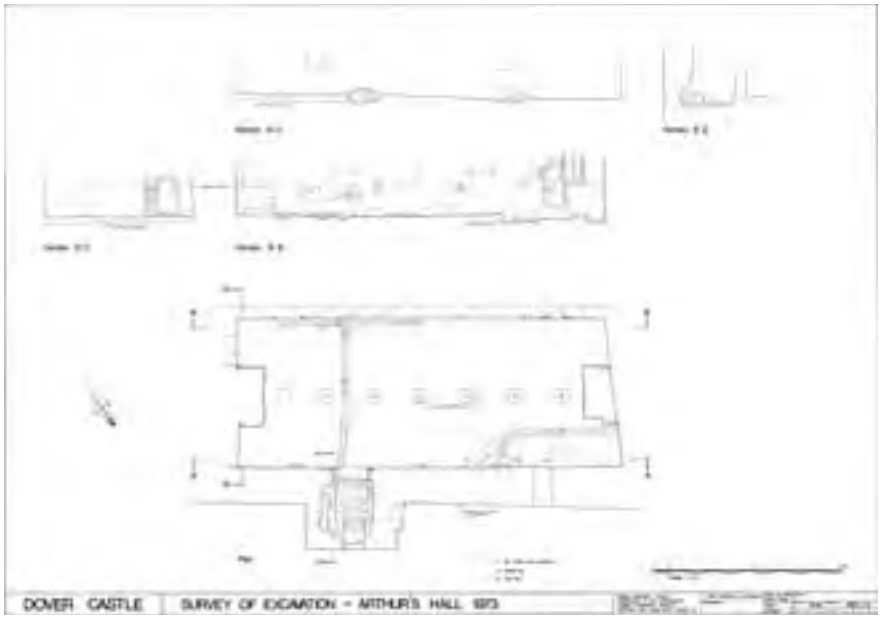
*Top:* Rigold's trench (D-D') between the Great Tower and museum building adjacent to Arthur's Hall. Note depth of deposits and general slope towards the east

*Bottom:* Trench drawing from 1970s excavations in Arthur's Hall







Trench A showing Great Tower footings, Caen-stone surface (foreground), and sondage against wall to expose early construction evidence



landform. The larger trench on the north side (Trench A) immediately demonstrated that the 'finished' landscape height against the building was always intended to be at its current height, because the nicely dressed facing stops at the turf. However, this turf is new, with evidence from the 1960s showing that a further 0.50m of the footings were exposed. These exposed footings were repointed with flint galletting (a style popular in the 18th century) suggesting the ground level had been reduced by the time the Inner Bailey was converted to barracks. Below the modern deposits we found a layer of Caen-stone chippings and dust that appears to be the builders' yard surface during the construction of the Tower. This in turn sat on various levelling deposits of clay that filled in the natural dip to the east, and which show up in Rigold's work as deliberate mound-building.

Trench C, in front of blocked medieval doorways, from walkway in Arthur's Hall



*Facing page, top:* Complex features in Trench C

*middle:* Trench E showing truncated pre-1238 wall (centre)

*bottom:* 'Inscribed' slates from the base of backfill in Trench E

Below the levelling was a sloping layer of buried soil that represents the pre-1180 surface of the Inner Bailey. It crested towards the centre of the north side of the Tower, suggesting the Inner Bailey enclosed a narrow ridge across which the footings of the Tower were cut. We also identified a pre-1180 feature sealed by this buried surface.

The smaller trench (Trench B) confirmed the Tower structure and intended landscape, but was more heavily affected by later developments such as the construction of a brick stair and the insertion of a pipe complete with brick-surrounded stopcock.

In Arthur's Hall we only wanted to know if anything survived below ground. Two trenches were opened at opposite ends of the room, exposing the plastic protection from the 1970s excavations, which covered extensive untouched deposits. These were examined with an eye toward both understanding their nature and assessing the likely impact of new structures proposed for the re-display programme. Trench C at the south end started with the *c*1238 floor, and then revealed evidence that the doorways were inserted. An earlier curving wall and other features unrelated to the Hall were also examined.

We reached nearly half a metre at the south end and almost a metre at the north, but saw no sign of underlying natural deposits. The earlier excavations cleared the room down to the level of the floor associated with the Hall of *c* 1238, but only poked below it at a few locations. To confirm the extent of the earlier work we opened eight further trenches down to the top of undisturbed archaeology around the room. One of these, Trench E near the northwest corner of the Hall, was deep enough to expose an earlier wall also seen in Rigold's work outside the building, giving us a clue to the complexity of the earlier Norman domestic buildings.

A great deal of new information was recovered, teaching us much about the Inner Bailey, the Great Tower, and the wealth of archaeology still hidden in Arthur's Hall – not bad for a month's work.

***Tom Cromwell***







DOVER CASTLE

# ‘Unlocking the evidence’ – Recording the historic graffiti in the Great Tower

**Visitors and prisoners in Dover Castle have left their mark in the form of graffiti for hundreds of years, setting us a challenge for effective recording.**

Besieged by thousands of visitors each year, the Great Tower of Dover Castle remains a very impressive structure. Commonly referred to as ‘The Keep’, its size and physical complexity - with various rooms, halls and galleries all interconnected by numerous staircases and passageways – cannot fail to leave a lasting impression. However the casual visitor may fail to notice the inscribed impressions (graffiti) left by previous visitors and incumbents on many of the internal walls. Such graffiti is of varying age and style, much of it dating back to the 1700’s when the Keep was used as a military prison. Some graffiti are carved relatively deeply into the fabric of the wall (up to a couple of centimetres). They typically consist of names and dates but there are others consisting of large areas of lightly inscribed patterns and shapes. As noted in a previous research report ‘*the ubiquitous nature of the graffiti in the tower is potentially one of the best and most interesting untold stories of Dover Castle*’.

Example sections of historical graffiti

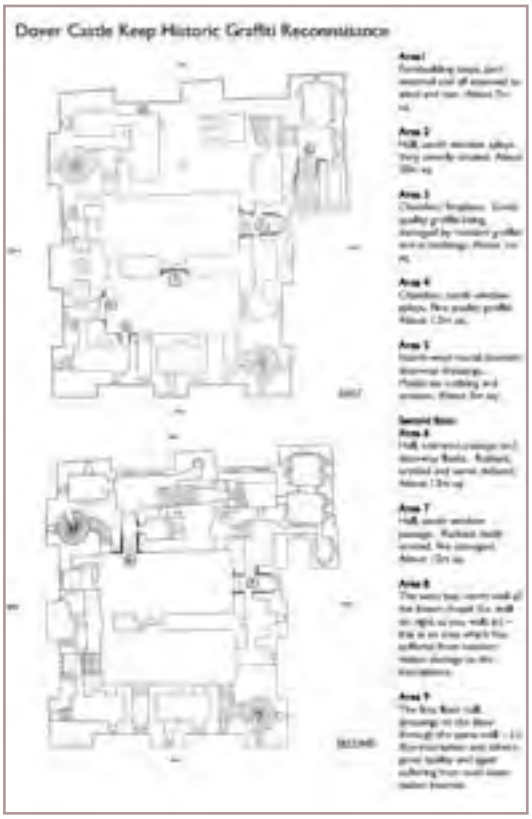
Stephen Tovey, © English Heritage

Stephen Tovey, © English Heritage

Some initial research and recording was undertaken by the previous site archaeologist, Kevin Booth, between 1997 and 1999. Using conventional rubbing techniques he was able to record the graffiti and provide an initial analysis/interpretation using a graffiti record form. Although 255 records were generated in this manner, this only amounted to a small proportion of the total as it was only undertaken where fabric analysis was already taking place. Given the need to develop Kevin’s work, and the eroding state of some areas of graffiti, an initial assessment of the actual amount covering the internal elevations was carried out in August 2008. Based on this and current plans for re-presenting the Keep interior, it was decided that the graffiti in nine principal areas were to be initially recorded, as shown on the plans.

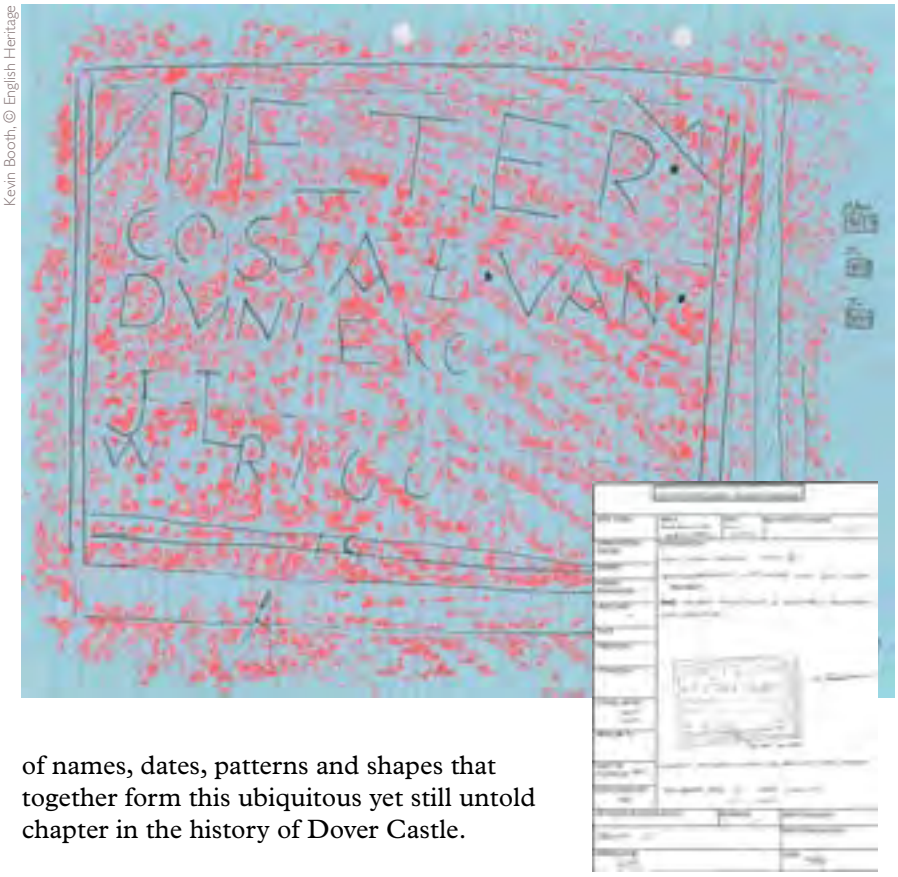
Rather than resort to conventional rubbing techniques the ‘lower-cost’ photogrammetric recording approach, developed during the Northumberland and Durham Rock-Art Project (NDRAP: see *Research News* 2, 24-8), was to be trialed. The required stereo-photography and survey control was jointly carried out by the Metric Survey Team, with assistance from Steve Cole (Head of Photography), and Atkins Geospatial (Bristol) with the latter procured and commissioned through the EH Framework Agreement for Metric Survey. Using high-resolution DSLR cameras eg the Canon 1DS MkIII (22MP) and Kodak DCS Pro (14MP), coupled with three-dimensional theodolite observations to temporary, pre-positioned targets, this provided the all important raw material for detailed photogrammetric processing. Using Topcon’s PI-3000 ‘Image Surveying Station’ software (now known as ImageMaster) a number of outputs are currently being produced ‘in-house’, with assistance from placement and intern students. These will form the basis of a three-dimensional record for the graffiti and hopefully provide the base material for later historical analysis, interpretation, documentation, condition monitoring and even replication. These include outline drawings of individual stones (along with their graffiti), ortho-rectified photomontages and numerous 3D Digital Surface Models (DSM) provided in VRML format at resolutions up to 2mm.

For all nine trial areas 207 stereo pairs were captured on site from which 979 DSM’s have so far been generated. Although this processing work is still in progress, once complete it will be supplied to Paul Pattison (EH’s Senior Properties Historian) to facilitate the next stage of analytical




*Left:* Study areas



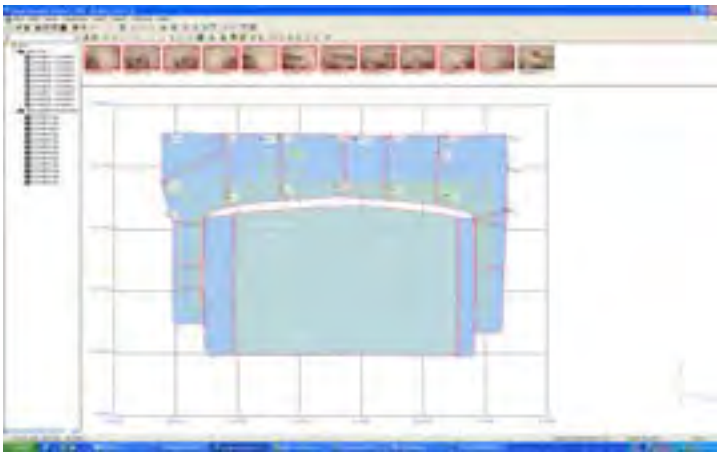


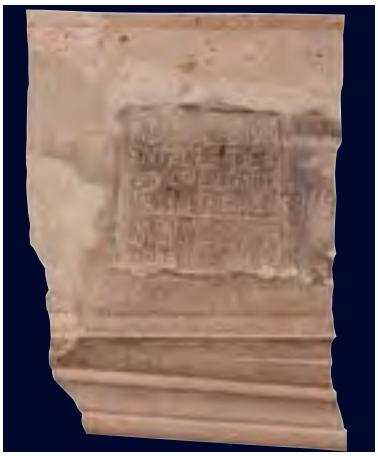
*Above:* Sample graffiti rubbing and record sheet

investigation and enable the creation of a searchable database for the graffiti. Also given the current re-presentation works in the Keep, prior to its public re-opening in August this year, it will provide an important record of the condition and wide variety of names, dates, patterns and shapes that together form this ubiquitous yet still untold chapter in the history of Dover Castle.

***Stephen Tovey and Paul Bryan***







*Left:* Example outputs for Chamber fireplace

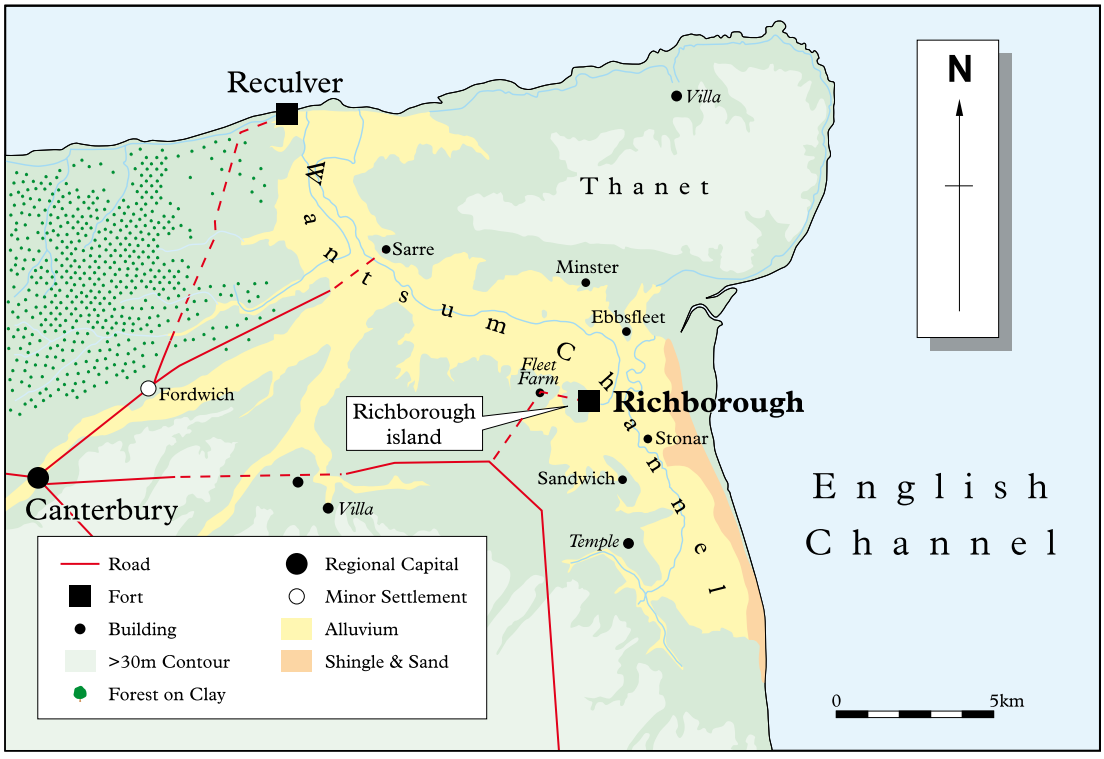
NEW DISCOVERIES AND INTERPRETATIONS

# Richborough, a Roman and medieval port!

**The site of Richborough in east Kent has long been known as the site of the Roman invasion of AD 43 and as the official gateway to Roman Britain for three centuries. But where was the Roman foreshore? And what was the status of the site in the middle ages?**

The classic Richborough excavations of the 1920s, undertaken by J. P. Bushe Fox, have long been the basis for understanding this important location in south east Kent. The site was an island during the Roman period, occupying a position on the south side of the Wantsum Channel, which then separated the Isle of Thanet from the mainland. The site was the main focus of the Claudian conquest in AD 43. It developed as a military supply base, and then as a major port town centred upon the great quadrifons arch that functioned as the ceremonial entrance to the province of *Britannia.* Geophysical survey in 2001 demonstrated that the town covered an area of at least 21ha (*CfA News* 3, 6-7). Finally, in the late 3rd and 4th centuries, the centre of the town together with the quadrifons was demolished to make room for the two successive phases of a large Saxon Shore fort.

Excavation and coring work in 2001 on the eastern flank of the Island, together with a new understanding of the meaning of work undertaken in the 1850s raised the complex question of the nature of the historic coast. The area had the potential to examine the relationship between archaeological deposits on land and the natural processes of erosion, waterflow and silting at work in the Wantsum Channel. The answer to this question is key to the understanding of Richborough, as in all periods its interaction with the sea provided its *raison d'etre.*






Location map showing Richborough and the Wantsum Channel



Aerial photograph of the Saxon Shore site looking north. The excavation trenches lay to the east, at the base of the slope near the railway line

The only accessible location where this question could be elucidated was at the base of the slope to the immediate east of the site. At this point a long section of the collapsed eastern wall of the Saxon Shore fort lies at the foot of the incline. The exact location of the foundations of this wall is unknown. Coring during 2001 showed that the break of slope across which the fallen wall lies was once the edge of open water. At first sight it appeared that the wall fell into water or mud. A single C14 date suggested that silting began in the 14th century, and that the wall collapse occurred after this. In order finally to clarify these issues, a series of six trenches were excavated along the fallen wall during the autumn of 2008.

The wall was cleared of thick vegetation, cleaned and recorded using laser scanning. It was clear that the wall collapsed in sections. Two large segments which had become detached from the standing wall had rolled down slope, flipping over completely so that the exterior tile-coursed facing faces west. The rest of the wall then collapsed in a single event, falling on its face, and sliding bodily down the slope, leaving its base exposed. The pieces of earlier collapse embedded in the ground at the foot of the slope caused the wall to part around them as it slid.

The most surprising result was the evidence for a re-use of the collapsed east wall in the late 14th century to form a waterfront incorporating a small dock . The gap between the sections of fallen masonry that had parted around the earlier collapse was walled up on the east side by a small section of rough flint wall 2.3m high, creating the dock, the side walls of which were formed by the segments of collapsed wall. This would have been perfectly adequate to protect a small craft from either fast flowing water or tides, were. Though the dock was totally silted up,

*Below:* The two stages of collapse. First the section with the tile course fell, then the whole wall fell and slid down-slope at 45 degrees









*Top:* The wall of the medieval dock, linking two segments of collapse. Note the tide marks on the large block at the base

*Middle:* Bushe-Fox's trench cut straight through an east-west medieval wall (left), which had originally been keyed into the base of the collapsed Roman wall (right)

*Right:* The natural processes beneath the collapsed wall. Waterlain silts at the bottom give way to orange clay laid down in marsh conditions. Above this is the buff colluvium

the lowest silts, which lay above naturally lain gravel, contained later 14th-century pottery and peg tile, suggesting the date for the use of the structure.

The west side of the fallen wall was cleared by Bushe-Fox. His single short paragraph recording that medieval material was found is dismissive. He was simply not interested in the post-Roman archaeology. He had located, and partially removed, an east-west wall, clearly of medieval date, which our work showed to have been butted against the base of the collapsed Roman wall, leaving a scar where it had been keyed into the Roman masonry. A large quantity of 14th century peg-tiles was piled against this wall. There was evidence that the wall had a southward return in the direction of the dock. This suggests two walls of a large waterfront building. On the site above this building lies the only known and excavated medieval building on the site; a small chapel of St Augustine which was built probably in the late Saxon period and continued in use to the 17th century. This chapel was clearly not an isolated feature. It was part of a waterfront settlement contemporary with the peak in prosperity of the Cinque Port of Sandwich.

Clearly the wall had collapsed by the 14th century. In one trench the natural proceses pre-dating the collapse were revealed. Over a metre depth of colluvium had washed down the slope over time. Erosion of the slope clearly destabilised the wall, which fell and slid down the bank of hill-wash into the silt at the base of the bank. The colluvium had developed over clay laid down during a phase of marsh development within the Wantsum Channel. Beneath the clays were deposits of silt and gravel deposited during periods of slow water-flow, and under this was a sand beach.

The obvious interpretation, much reported in the press, was that the beach at the bottom of the sequence was the Roman shore line, and that the natural processes up to the collapse of the wall had taken place over the millennium between the 4th and 14th centuries. This appeared to be confirmed by the discovery of Roman pottery on the sand. Despite this, however, the possibility remains that the shore line was subject to complex processes of deposition and erosion. The analysis of samples taken on site will clarify this issue.

***Tony Wilmott and Jessica Tibber***

# New base mapping assists landscape research



**Access to new data sets is changing the way English Heritage's survey teams interpret the historic landscape.**

When setting up a GIS system it is important to acquire accurate, fit for purpose and cost effective data. For English Heritage national coverage is vital, and costs of base mapping data have always been high. For Central Government organisations, the Pan-Government Agreement (PGA) for the supply of digital mapping and associated products now provides us with a wide variety of mapping, address, height and aerial photography data from Ordnance Survey (OS), Landmark Information Group and Next Perspectives™. We have access to data we could not previously afford, and PGA data usage across Government ensures a common geographic reference framework by which data can be exchanged and supplied.

Next Perspectives™ is a consortium of three suppliers of height and imagery data – Infoterra Ltd, Bluesky International Ltd and Getmapping PLC who have come together under PGA to provide UK coverage of a range of data. Products currently available include:

- *25cm resolution RGB Aerial Photography, including the original stereo frames for in house 3D interpretation*
- *50cm resolution Colour Infra-Red Aerial Photography*
- *5m interval linear contours*
- *5m resolution Digital Terrain Model*
- *2m resolution Digital Surface Model*
- *1m/2m resolution Lidar*

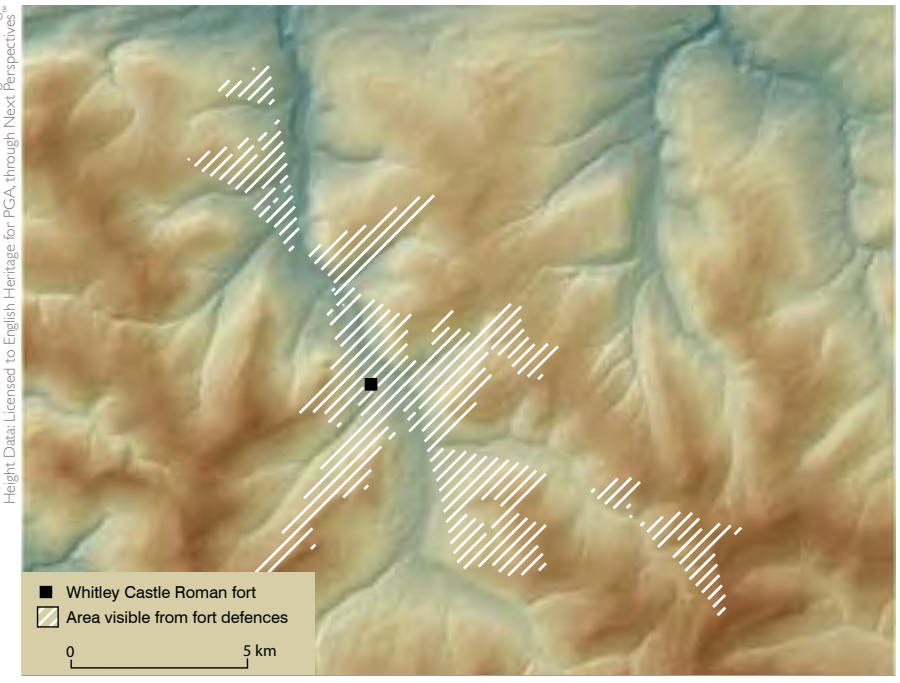
All data is modern and, due to an agreed PGA re-flying cycle, should be no more than five years old.

Data is currently made available to EH staff via the Next Perspectives™ on-line data site 'GeoStore™ for PGA'. This allows users to download data for individual project areas without the need to maintain large data holdings on internal servers. Within minutes – depending on the data volumes – GeoStore™ will email the user with a zipped file containing the data they require. Users can quickly access data for any area in England, and easily download more if their project area expands. Access to these new data sets is rapidly changing the ways in which English Heritage is able to understand and promote the historic landscape. The ways in which our teams use GIS in their interpretive work are also expanding and developing.

The aerial photography and height data now available have proved of enormous benefit to the work of the Archaeological and Aerial Survey and Investigation teams. Height data replaces the OS Land-Form PROFILE® contour data and offers a significant increase in accuracy. Whether supplied as contours or as a grid of 3D points data can be used to create digital landscape models for making maps or for conducting desk-

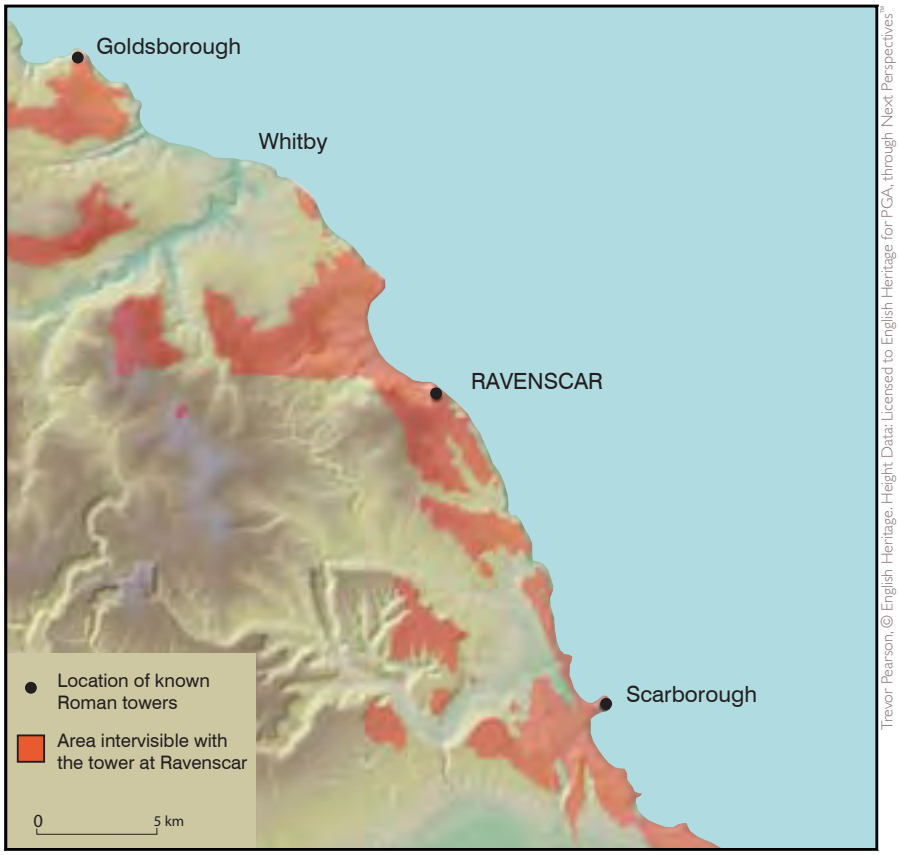
NextPerspectives™

The Next Perspectives logo






The results of a viewshed analysis of Whitely Castle applied to a digital landscape model of the Roman fort's immediate surroundings






A viewshed analysis of part of the Yorkshire coast indicates that the Roman towers at Goldborough and Ravenscar would have had to have stood at least 30m high to have been intervisible. It seems unlikely that the towers were this high and instead the analysis lends weight to the possibility of an intermediate watch tower, probably at Whitby

based landscape analyses using our ESRI ArcGIS software. It is also vital during the rectification of aerial photographs, especially in hilly landscapes.

A good example of the analytical use of a digital model is in viewshed analysis, investigating the visibility and intervisibility of sites in a landscape. GIS analyses site location against the digital landscape model and shades those areas which can be seen from the site. This creates a simple, graphical illustration of how a site dominates its surroundings. For the Roman fort at Whitley Castle near Alston in the North Pennines contour data was downloaded from the GeoStore™ site and used to create a 3D representation of the landscape. Points were then added to the model to represent the estimated original heights of the four corner towers of the fort and the GIS then calculated the areas that would have been visible from one or more of these positions. The resulting diagram gives some estimation of how the fort related to its local surroundings. The fort would have dominated a relatively small, 3km long stretch of the South Tyne valley immediately to its east but any more distant views along the valley are obstructed by the higher hills to the north and south. The map resulting from the analysis is a useful way of demonstrating the visibility of the fort, effectively replacing the need for many photographs or a long descriptive text. In another case, a digital model of north-east of Yorkshire was created to examine the inter-relationship between part of the chain of Roman watch towers built along the east coast in the late 4th century AD. The analysis based on the site of the Roman tower at Ravenscar indicates that to be intervisible and to exchange signals, this tower and that to the north at Goldsborough would have been around 30m high. Any lower and the intervening hills would have obscured the sight lines.

Analysis and synthesis of data mapped from aerial photographs as part of the National Mapping Programme (NMP) within a GIS environment has also been enhanced by the use of Next Perspectives™ data. The resolution of the height data means that subtle differences in height and topography can be identified. During the Hadrian's Wall NMP project a number of linear ditches were noted to the north of the Roman fort at Carvoran. Fortunately, the fort and its hinterland just fell within an area of 2m Digital Surface Model (DSM) data coverage. The resolution and accuracy of this data is such that even small features such as hedges and buildings are modelled in the DSM. A 3D model of the landscape was created in GIS using this data. The NMP data and Next Perspectives™ aerial photography were then draped over the model, enabling the features to be viewed in 3D. Spot heights were taken along the course of the linear feature and contours produced along the length of the feature to assess the direction and steepness on incline. Though this did not entirely rule out the initial interpretation of the feature as the fort's aqueduct, it is now thought more likely to have been a quarry track.

Access to modern countrywide colour vertical photography is a valuable addition to sources already available through the National Monuments Record (NMR) and other collections. The aerial photographs available from GeoStore™ are at such a high resolution that features barely 1m across are clearly visible. The photographs are supplied as orthorectified images meaning they have been adjusted electronically to remove perspective and other distortions and can be used very much like a detailed large-scale map. The photographs have proved invaluable in helping the field teams locate and map sites either by measuring on to a paper copy

of the image or using a digital version loaded on to a GPS device for satellite mapping. In some of the more remote upland areas the aerial photographs are more accurate and show more detail than the available editions of the OS maps. They can also be used to map recent land-use, erosion etc, allowing insight into the impact of environmental change. The height and aerial photography datasets are being fully integrated into an NMP project as part of the multi-disciplinary North Pennines AONB project (*Research News* 11). Next Perspectives™ aerial photography is being used as a layer in AutoCAD Map to supplement more traditional imagery. It is of particular use when assessing the probable current condition of archaeological remains as it represents the most recent source of photography for the majority of the project area. Because the photography has been orthorectified it can also be used to directly map archaeological features from with a degree of accuracy within the range of ±1.5m.

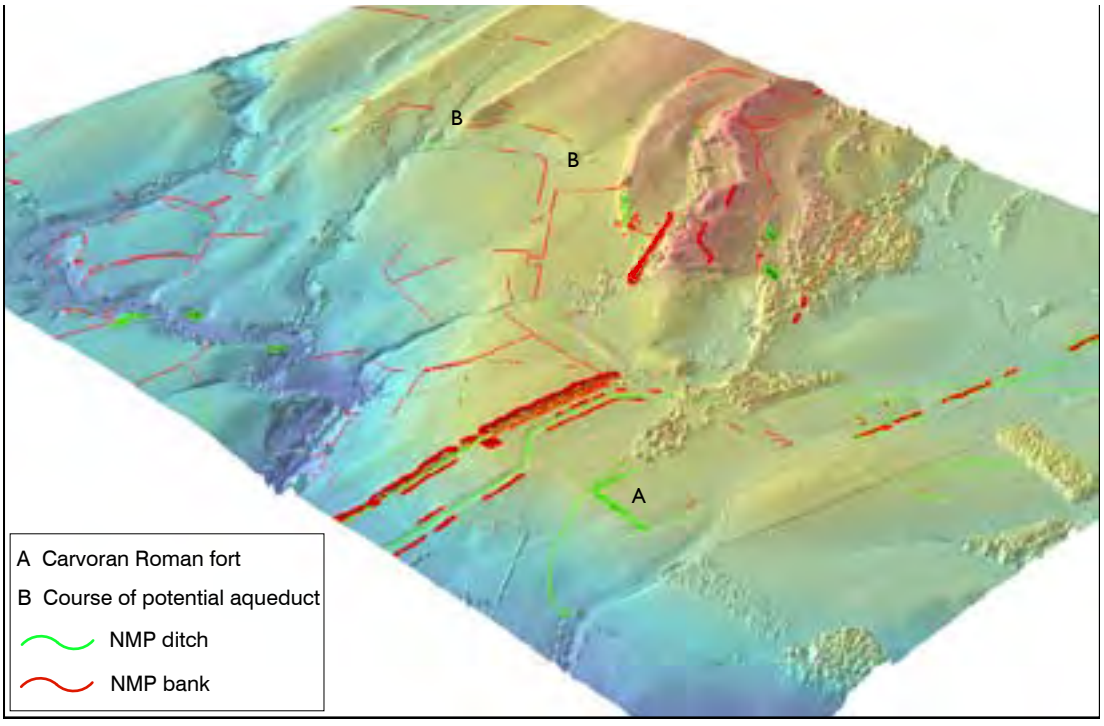
Rectification of aerial photographs is undertaken by the Aerial Survey team in a specialist programme called AERIAL. The process relies on a set of control points that can be seen on both the photograph and the map base. In upland regions finding mapped control points such as field boundaries is often difficult. Inaccuracies in the OS map base, such as those identified by the field teams, may increase the margin of error during rectification. For these reasons the Next Perspectives™ aerial photography is being used alongside OS MasterMap® data within AERIAL as a map base to rectify other photographs that show the archaeological features more clearly. Features seen on the georeferenced image but not depicted on the OS map can be used for control.

Use of data from Next Perspectives™ for landscape analysis and research is undoubtedly going to increase further over time as both teams gain experience in how best to use the data in the field and in the office. Access to the data through the PGA is helping to further the work of the Aerial Survey and Investigation team and to continue the development of the National Mapping Programme. It is anticipated that this will be increasingly used as a tool in the future, notably in the post-mapping analysis of our data.

Next Perspectives™ PGA data sets are available to English Heritage staff for use in their work. Under certain circumstances, data may also be supplied to contractors carrying out English Heritage's core business. To find out more about accessing PGA data – and for any copyright and usage queries – please contact David Gander, webGIS Manager and PGA / OS Liaison Officer, tel 020 7973 3094, david.gander@english-heritage.org.uk.

***David Gander, Matthew Oakey and Trevor Pearson***






A 3D digital model of the landscape around the Roman fort at Carvoran showing the location of a potential aqueduct

DEVELOPING METHODOLOGIES

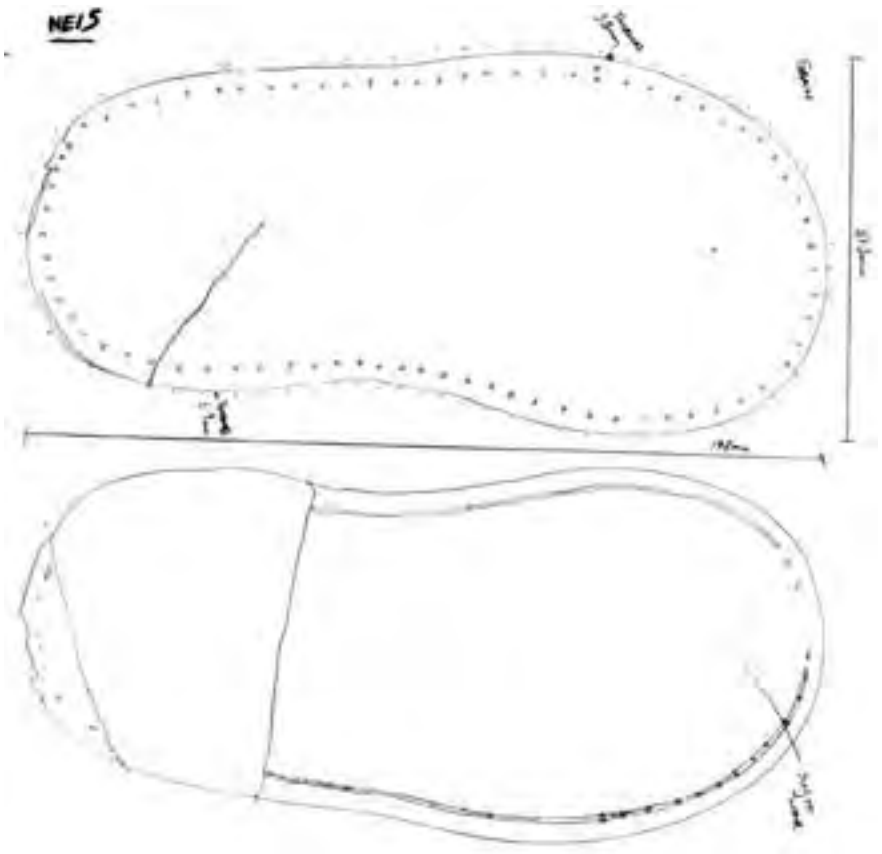
# The leather drying trial

## A comparative study of various impregnation and drying methods for waterlogged archaeological leather.

The vacuum freeze drying of waterlogged archaeological leather is often perceived as expensive. The initial costs of purchasing a freeze dryer, the maintenance and running costs or lack of access to a freeze dryer means a limited number of commercial archaeological conservation laboratories and museums are able to vacuum freeze dry leather. While other drying methods exist, the lack of comparative data seems to result in a reluctance to use alternative methods.

The aim of this study was to compare different treatment and drying methods using parameters such as shrinkage, flexibility, appearance, time, effort and equipment. A condition score system, based on one originally devised by Kirsten Suenson-Taylor and Dean Sully, was used to judge the outcome of each individual method. The conserved leather was also evaluated at a seminar held with conservators and finds specialists from UCL, The Archaeological Leather Group and Museum of London.

Annotated drawing before conservation






The leather used was donated by Dean Sully, Lecturer in Conservation, University College London (UCL). It was collected by UCL in 2003 from discarded material on the spoil heap of an excavation at Novgorod, an urban site in North West Russia. It had been used by UCL conservation students as part of their training in animal identification, but as UCL had no further use for the material it was ideal for the Leather Drying Trial.

The 89 bags of leather donated comprised leather off cuts or fragments. All the bags were filled with water and had been constantly stored in a fridge. A brief visual assessment was carried out, establishing that the leather was from three different areas of the site, the leather from one area being noticeably more friable and fragmented than the leather from the other two areas. The leather was rinsed, and the water changed.

Before treatment commenced all the pieces were recorded using photography and annotated drawings. The pieces were briefly described and their condition recorded using the score sheet. Points (1 to 4) were given in the categories of pre-burial damage, cohesivity, friability and flexibility: the higher the number the better the condition of the leather. An additional flexibility test was carried out whereby flexibility was defined as the degree in change of movement when the leather was suspended over an edge. The degree of movement was measured in degrees, with 0° being no change and 90° being the maximum change. The recording was repeated after treatment. All information regarding one piece of leather was recorded on a specially designed object sheet.

Sample selection for each treatment was random with the exception of the friable and fragmented leather: these were all

freeze dried. Once selected, the samples then received the same standard treatment, this was not adapted to the condition of the leather in order to compare results across the various treatments and conditions. The methods were as follows:

| Treatment | Drying method |
|---|---|
| No Impregnation | |
| 5% EDTA | Air Drying |
| 20% Glycerol | Controlled Air Drying |
| 20% PEG400 | Vacuum Freeze Drying |
| 5% EDTA 20% Glycerol | Non-Vacuum Freeze Drying |
| 5% EDTA 20% PEG400 | |

Half of the samples were treated with a 5% solution of EDTA (Ethylenediaminetetraacetic acid) for 2 hours followed by 48 hours rinse in running tap water. EDTA is a complexing agent sometimes used for the removal of iron stains, concretions or minerals that have leached from the burial environment into the leather.

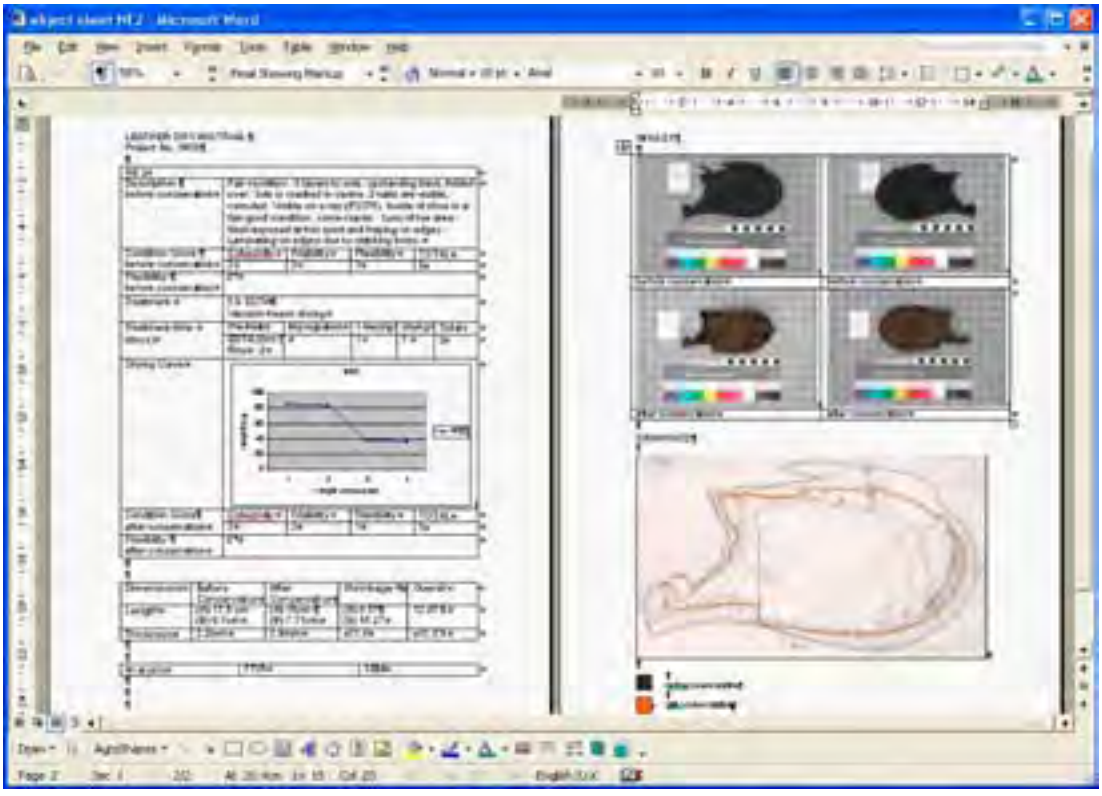
Before waterlogged archaeological leather can be dried out it requires treatment (impregnation) to replace some of the water in the leather and to act as a bulking agent to prevent shrinkage. The leather was soaked in a 20% solution of Glycerol or PEG400 (Polyethylene glycol) for three days. The pieces were dried as found, for example, folded pieces of leather were not laid out flat nor weighted down. A data logger was used (with the exception of the freeze drier) to record temperature and humidity during the drying period for all drying methods.

- *Slow air drying was carried out in a tray covered with polythene sheet away from direct sun light.*
- *Controlled air drying used saturated salt solutions to establish and maintain a fixed relative humidity (RH) in a closed system. The RH was lowered in increments every three days from 90%RH, to 75%RH and finally to 55%RH.*



Flexibility test





Object sheet for leather NE2



Vacuum Freeze Dryer at Fort Cumberland

- *Freeze drying took place in a vacuum freeze drying chamber.*
- *Non-vacuum freeze drying was carried out in a domestic chest freezer with the addition of silica gel and a fan. Both freeze drying and non-vacuum freeze drying rely on sublimation whereby frozen moisture in the leather directly transfers from the solid to gas phase with no intermediate liquid phase. For non-vacuum freeze drying the fan blows a constant stream of cold air over the leather and this carries the sublimed moisture over to the silica gel where it is absorbed.*

The weight of each piece of leather was recorded daily throughout the drying period. The end point was established when one or more of these parameters were noticed:

- *The leather felt and looked dry,*
- *Two constant weights were measured,*
- *All ice crystals had disappeared.*

Non-Vacuum Freeze Drying, view inside the chest freezer (bottom left corner: fan, centre: leather in wire baskets, top: silica gel)



The results were compared with regards to shrinkage, flexibility, condition score, treatment time and required equipment.

Shrinkage was calculated by measurements of the length and width at fixed points on the leather before and after conservation. The mean shrinkage for all leather was 7.37%, a value that is acceptable in the treatment of waterlogged archaeological leather. The lowest shrinkage values for treatment were achieved using 20% Glycerol (5.26%) and the highest by using 5%EDTA only (9.2%).

For the drying methods air drying resulted in the lowest shrinkage values (6.17%) and controlled air drying in the highest shrinkage values (8.43%). Just over a third of the items exhibited a change in flexibility with the majority decreasing in flexibility. The 5% EDTA 20% Glycerol treatment followed by vacuum freeze drying resulted in the greatest number of items increasing in flexibility.

The shortest treatment time was achieved with freeze drying (4.4 days) and the longest with controlled air drying (9.1 days). The method requiring least effort and equipment was air drying, as all that was needed was a tray, a cover and a pair of scales. All other methods required slightly more time in preparation, monitoring or equipment.

Regardless of the treatment, all the leather looked aesthetically very pleasing. Leather treated with EDTA resulted in higher shrinkage and increased flexibility and this is probably due to the fact that some minerals from within the leather were removed and the fibre structure was loosened. It would therefore be recommended to only use EDTA in exceptional cases and not as a standard method.

Controlled air drying was the most labour intensive method and this technique requires further work and improvement. Non-vacuum freeze drying worked very well. This process could be sped up by gently manipulating the shape of the leather (the formulation of ice crystal in creases prolonged the drying process). Freeze drying was a very rapid method of drying and the leather felt rather dry and brittle when it first came out of the freeze drier. Since then the pieces have acclimatised and appear to be less dry. Air drying worked very well and when carried out with care and caution this could be a very valid alternative compared to freeze drying.

Further work on the leather includes the use of a Scanning Electron Microscope (SEM) to look at differences in the fibre structure of leather conserved using different methods. Fourier-transform infrared spectroscopy (FTIR) analysis will examine the changes in the leather as a result of treatment and long term storage.

***Karla Graham and Angela Karsten***

# NOTES & NEWS

**A round-up of activities and developments showing some of the scope and variety of projects that are ongoing in the Research Department.**

## NEWLY REFURBISHED FINDS PROCESSING FACILITY

The Archaeological Projects team are pleased to announce the recent re-opening of their dedicated archaeological finds processing facility at Fort Cumberland after a four month refurbishment programmme.

The facility, housed in a First World War billet hut within Fort Cumberland, received significant bomb damage during the Second World War. This necessitated a major rebuild of the building, which has received only minor upgrades since.

The new facility has been designed with the help of the users to meet all their needs for the recording of archaeological finds. It incorporates systems to allow digital recording. The building also contains a new multi-use room for meetings/video conferencing, hot desking and project room space for short term contracted staff returning from excavation to work on project archives. With the help of the Inspector of Ancient Monuments and the Properties Curator for Fort Cumberland we have been permitted to incorporate technologies that will improve the energy efficiency rating of the building. A further project is underway, with the help of the Building Services Engineering and Safety Team, to use the facility as a test bed for Wind Turbine technology and other energy saving measures where suitable.

*David Webb*

## CHESTER AMPHITHEATRE CONFERENCE PUBLISHED

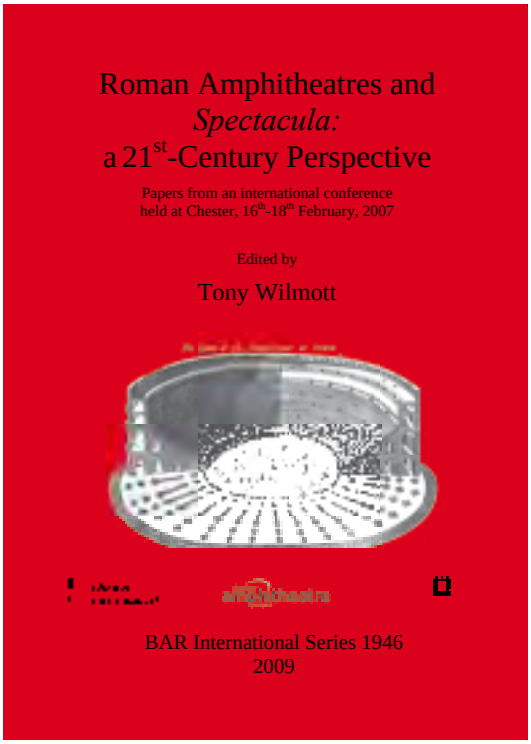
The International Conference on the Roman Amphitheatre held in Chester in February 2007 was reported in *Research News* 6 (30-31). The collected papers from the conference have now been published as a volume in the British Archaeological Reports International Series. The volume includes almost all of the papers given at the conference itself, but also includes a series of papers that were offered by scholars who for one reason or another could not be included on the conference

*Top:* The building after bombing in World War II

*Bottom:* The refurbished interior of the finds processing building








The front cover of Roman Amphitheatres and *Spectacula:* a 21st-Century Perspective



programme. The contents are grouped under the headings *Amphitheatre Planning*, *Regional Studies*, *Single Site Studies*, *Planning and Function*, *Gladiators and* Spectacula, and *The End*. Papers cover the whole period of the Amphitheatre and its spectacles across the Empire from Britain to Asia Minor and North Africa, including both civilian and military sites.

***Tony Wilmott***

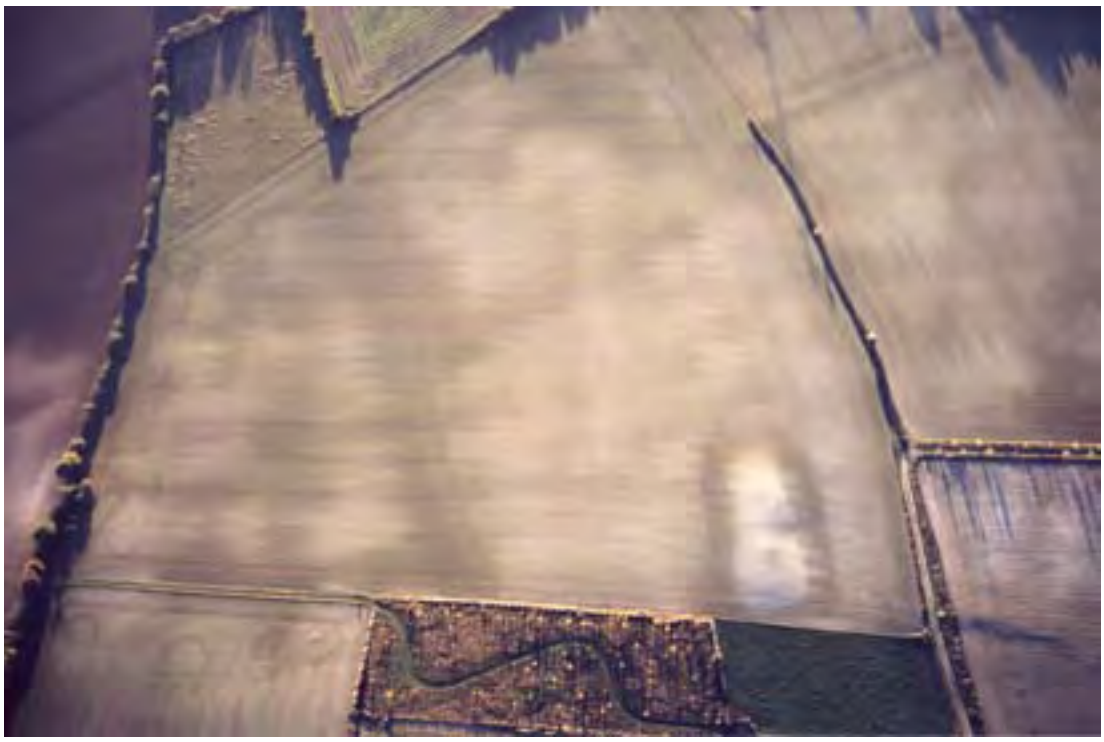
## DAVID EARLE ROBINSON

David Earle Robinson completed his term as Chair of the Association of Environmental Archaeology (AEA) in September 2009. In recognition of his contribution David was recently awarded honorary life membership, one of only nine people to receive this accolade in the association's thirty year history.

## EARTHWORKS AND CROPMARKS AT DAMERHAM, HAMPSHIRE

Monuments discovered through the Aerial Survey & Investigation team's annual reconnaissance programme hit the news recently following geophysical survey by a team led by Kingston University-based Helen Wickstead. A long barrow surviving as an earthwork some 70 metres long was first photographed by Roger Featherstone in 1997, along with circular features visible as soilmarks. In 2001, Damian Grady photographed the same complex as cropmarks, capturing much more detail in the process. In 2008 a second long barrow was discovered. A long-term programme of geophysical and other forms of survey, fieldwalking and, eventually, excavation is planned. Full use of an enthusiastic local community will be made in all aspects of the project.

***Martyn Barber***



The larger Damerham long barrow, as photographed by Roger Featherstone in 1997

## DOVER CASTLE GREAT TOWER CONFERENCE

The conference will take place over two days (25th-26th September 2009) at the Society of Antiquaries in London, followed by an optional third day at Dover (27th), where delegates can explore and discuss the Great Tower with the conference speakers.

Conference fee for the two days (25–26 September 2009): £60 including morning and afternoon tea/coffee and buffet lunch. Optional day visit to Dover Castle – to include coach transport London to Dover and return, and subject to sufficient demand (Sunday 27 September 2009): £10

***Paul Pattison***

## RESEARCH DEPARTMENT REPORT SERIES: April 2009 – June 2009

### 2008 SERIES

68. Bayley, J, 'Lincoln: Evidence for Glassworking on Flaxengate and Other Sites in the City'

81. Bridge, M C, 'White Horse Public House, 116 Green Street, Enfield, Middlesex: Tree-Ring Analysis of Short Timber Posts'

91. Payne, A W, 'Haydons Field, East Harptree, Somerset. Report on Geophysical Survey, July 2008'

### 2009 SERIES

9. Fradley, M, 'Charterhouse, Somerset: The Development of a Romano-British Mining Settlement and Associated Landscape'

13. Cocroft, W D and Newsome, S, 'The Atomic Weapons Establishment, Foulness, Essex: Cold War Research & Development Site. Survey Report'

14. Cocroft, W D, Newsome, S and Millward, J, 'Repository Woods, Woolwich, London: An Archaeological Survey of the Royal Military Repository Training Grounds'

17. Canti, M, 'A Review of Geoarchaeology in the Midlands of England'

18. Paynter, S, 'St Gregory's Minster, Kirkdale, North Yorkshire: Analysis of a Glass Rod'

19. Smith, P, 'Leicester Castle, Leicester, Leicestershire, The Courtrooms in the Former Great Hall: Historic Buildings Report'

21. Karsten, A, 'Clatterford Roman Villa, Isle of Wight: The Conservation and Investigation of a Waterlogged Shale Object'

24. Fyfe, R, 'Pollen Analysis of Blanket Peat Deposits at Roman Lode, Burcombe, Exmoor, North Devon'

25. Gardner, C, 'Hightown, Castleford Yorkshire. An Assessment of Glass Waste'

26. Gardner, C, 'Chester, Cheshire. Assessment of Evidence for Metal Working from Chester Amphitheatre'

27. Mays, S A and Vincent S, 'Osteological analysis of Human Remains from Whitby, Whitby Abbey Headland Project: Southern Anglian Enclosure 1999-2000'

30. Bishop, S, 'The Carrant Valley Landscape NMP, The Carrant Valley, National Mapping Programme Report'

35. Howard, R E, Arnold, A J, Tyers, C and Hurford, M, 'Exeter Cathedral, Exeter, Devon: Tree-Ring Analysis of Timbers From the Song School Door'

36. Howard, R E and Arnold, A J 'Grandy's Knowe, Bardon Mill, Northumberland: Tree-Ring Analysis of Timbers'

40. Field, D, 'Airmans Corner, Winterbourne Stoke, Wiltshire: Investigation of Earthworks'

42. Howard, R E and Arnold, A J, 'St Andrew's Church, Alwington, Devon: Tree-Ring Analysis of Timbers from The South Aisle and Nave Roofs'

43. Franklin, G, 'Inner-London Schools 1918-44: A Thematic Study'

44. Howard, R E and Arnold, A J, 'Cockle Park Tower, Hebron, Morpeth, Northumberland: Tree-Ring Analysis of Timbers'

45. Howard, R E and Arnold, A J, 'Church of St Laurence, Alvechurch, Worcestershire: Tree-Ring Analysis of Timbers from the Belfry Floor'

46. Howard, R E and Arnold, A J, 'The Barn, Court Lodge Farm, Bilsington, Kent: Tree-Ring Analysis of Timbers'

# *NEW* **PUBLICATIONS**

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Bayliss, A, Healy, F, Bronk Ramsey, C, McCormac, F G, and Mercer, R, 2008 'Interpreting Chronology' in R Mercer and F Healey *Hambledon Hill, Dorset, England: excavation and survey of a Neolithic monument complex and its surrounding landscape*, Swindon: English Heritage, 378–411

Bayliss, A, Fenton Thomas, C, and Bronk Ramsey, C, 2009 'Radiocarbon dating' in C Fenton-Thomas *A place by the sea: excavations at Sewerby Farm, Bridlington*. On-site Archaeol Monogr, **1**, 294–301

Bayliss, A, 2009 'Rolling out Revolution: using radiocarbon dating in archaeology'. *Radiocarbon*, **51**, 123–47

Brodie, A and Winter, G 2009 'Les stations balnéaires anglaises au XVIIIe siècle' in *Destination Normandie Deux siècles de tourisme XIXe-XXe siècles*. Textes réunis et présentés par Alice Gandin, **5 Continents Editions**

Carpenter, E 2008 'A Circular Moat at Long Hills Farm, Mickleton, Gloucestershire'. *Trans Bristol Gloucs Archaeol Soc*, **126**, 131-138

Carroll, Rutter 2009 *Ryder and Yates Twentieth century Architects*, RIBA (Harwood E (ed)).

Cattell J and K A Morrison 2008-9 'Review of the 2008 Conference Tour, East Kent'. *Newsletter Soc Architectural Historians Great Britain* **96**, 17-20

Chiverrell, R C, Foster, G, Thomas, G S P, and Marshall, P 2009 'Sediment transmission and storage: the implications for reconstructing landform development'. *Earth Surface Processes and Landforms* DOI: 10.1002/esp.1806

Chiverrell, R C, Foster, G, Marshall, P, Harvey, A M, and Thomas, G S P 2009 'Coupling relationships: hillslope-fluvial linkage in the Hodder catchment, NW England', *Geomorphology*, **109**, 225-235

Cole, E 2009 (ed) with contributions from H Spencer, S Skedd, R Bowdler and T Jones *Lived in London: Blue Plaques and the Stories Behind Them*, Yale University Press

Crocker, A and Franklin, G 2009 'Banknote Papermaking at Portal's Laverstoke Mill in 1854'. *The Quarterly* **70**

Dungworth, D, Degryse, P and Schneider, J 2009 'Kelp in historic glass: the application of strontium isotope analysis', *in* P Degryse, J Henderson and G Hodgins (eds) *Isotopes in Vitreous Materials*. Leuven: Leuven University Press, 113–130

Fell, V 2009 'Modern iron analogues buried for 30 months at the archaeological site at Fiskerton, England. *Beiträge zur Erhaltung von Kunst- und Kulturgut*, 97-103

Foster, G C, Chiverrell, R C, Thomas, G S P, Marshall, P, and Hamilton, D, 2009 'Fluvial development and the sediment regime of the lower Calder, Ribble Catchment, northwest England'. *Catena* **77**, 81-95

Gearey, B G, Marshall, P, and Hamilton, D, **2009 'Correlating archaeological and** palaeoenvironmental records using a Bayesian approach: **approach: a case study from Sutton** Common, South Yorkshire, England'. *Journal of Archaeological Science* **36**, 1477-1487

Griffiths, S, Marshall, P, Bayliss, A, van der Plicht, J, and Cook, G 2009 'Radiocarbon dating' (p83-86) in K Powell, G Laws and L Brown A Late Neolithic/Early Bronze Age enclosure and Iron Age and Romano-British settlement at Latton Lands, Wiltshire. *Wilts Archaeoll Nat Hist Mag*, **102**, 22-113

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Jecock, M 2009 'Archaeological Survey of a Deserted Medieval Village at Ulnaby'. *Archaeology in County Durham* **4**, 41-5

Linford, N 2009 'Report on a geophysical survey east of the Wall Fort' *in* Breeze, D J and Woolliscroft, D J (eds), *Excavation and Survey at Roman Burgh-by-Sands, Cumbria Archaeological Research Reports*, **1**, Cumberland Westmorland Antiq Archaeol Soc: Carlisle, 52-55

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Wickstead, H, Carey, C, Bayer, O, and Barber, M 2009 Discoveries to the east of Cranborne Chase: The Damerham Archaeology Project, *Past*, **61**, April 2009, 9-12.

Wickstead, H, Carey, C, Bayer, O, and Barber, M 2009 More to find in the Wessex heartlands: remote sensing and geophysical survey near Damerham, Hampshire, in *CBA Wessex Newsletter* Spring 2009, 17-19.

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